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KLAUBER & JACKSON
411 HACKENSACK AVENUE
HACKENSACK, NJ 07601

EXAMINER

RONESI, VICKEY M

ART UNIT

PAPER NUMBER

1714

DATE MAILED: 06/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/072,612

Applicant(s)

COLBURN ET AL.

Examiner

Vickey Ronesi

Art Unit

1714

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 5-14 is/are pending in the application.
- 4a) Of the above claim(s) 3 and 4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 5-14 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☒ Claim(s) 1-14 are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05/13/02 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Election/Restrictions

1. Claims 3 and 4 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Applicant timely traversed the restriction (election) requirement in the reply filed on May 12, 2004.

Drawings

2. This application lacks clear micrographic images; however, the images are acceptable for examination purposes. In particular, both figures are blurry, and the scale bar in Figure 2 is illegible. If the application is allowed, applicant will be required to submit images of sufficient quality so that all details in the photographs are reproducible in the printed patent. The Notice of Draftsperson's Patent Drawing Review (PTO-948) has been included.

Specification

3. The disclosure is objected to because of the following informalities: typographical and grammatical errors.

On page 3, line 23 of the specification, delete second "of."

On page 3, line 24, "tdo" should be replaced with "at" or another word deemed appropriate by applicant.

On page 4, line 6, there should be a space after “1,” and “2 *and* TEM” should read as “2 *are* TEM.” (emphasis added)

Under the heading “Examples,” applicant has listed sections named “B” and “C.” Section “A” is missing.

Appropriate correction is required.

In addition, it is unclear to the examiner what the “-” in Table 1 for Notched Izod tests at -32°C suggests on page 8, line 6, i.e., was the test not completed, was a quantitative result not possible because the material was too weak? If the latter, this is contrary to applicant’s teachings on page 1, lines 21-26 where it is stated that the comparative materials “retain high level of impact strength at substantially lower temperatures... ie. -80°F.” It was further noted by applicant that the disadvantage of the commercial resins was their optical, not mechanical, properties. Please provide an explanation.

Claim Objections

4. Claim 5 is objected to because of the following informalities: lack of antecedent basis for “multipolymer hard phase.” Examiner recommends a revision so that claim 5 reads as “multipolymer.” Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 6 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 is inadequately described with respect to whether the two described formulas should be added individually to the composition, in combination with each other, or either. The specification does not provide the necessary details.

The term "commercially significant level" in claim 11 is a relative term which renders the claim indefinite. The term "commercially significant level" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 2, 5, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Troy et al (US 5,599,854) in view of Toyo (UK 1,180,085) and further in view of Cutter (US 4,598,123).

Troy et al discloses a composition comprising from 2 to 40 wt % of a methyl methacrylate-butadiene-styrene (MBS) copolymer (col. 3, lines 12-14) polymerized from a free-radical process (col. 12, line 15) and from 60 to 98 wt % of a matrix polymer that includes, for

example, poly(methyl methacrylate), styrene-acrylonitrile copolymers, and the like (col. 1, lines 10-11; col 2, line 8). The MBS copolymer comprises at least 40 wt % butadiene (col. 12, line 11) and, in one embodiment, 12 wt % methyl methacrylate and 10 wt % styrene (col. 11, lines 8-9). The average rubber particle size ranges from 120 to 240 nm.

Troy et al does not explicitly disclose the use of a UV stabilizer and other additives; however, its composition is open to such common additives as indicated by an example that includes lubricants, plasticizers, and processing aids (col 5, lines 25-42). Toyo discloses the use of plasticizers in a composition comprising an acrylic-based multipolymer modified with a butadiene rubber (page, 8, lines 70-77) and Cutter discloses the use of UV stabilizers such as benzotriazoles in amounts up to 1 wt % and antioxidants in amounts up to 1 wt % as advantageous to improve thermal stability and weatherability in an acrylic-based, butadiene rubber-modified composition (col. 4, lines 8-22). A person of ordinary skill in the art would have been motivated to add such common additives to Troy et al's composition. Moreover, the addition of UV stabilizers, antioxidants, and plasticizers is optional as suggested by a percent concentration that includes 0 wt %.

Troy et al does not disclose the specific multipolymer in claim 1. Toyo discloses a highly impact-resistant and transparent thermoplastic composition comprising an acrylic-based multipolymer modified with a butadiene rubber, the multipolymer comprising 40 to 85 wt % methyl methacrylate, 15 to 60 wt % styrene, and at most 30 wt % of at least one comonomer selected from methyl acrylate, ethyl acrylate, butyl acrylate, and acrylonitrile. It is crucial to note that due to the use of "at least one comonomer," one of ordinary skill would at once be motivated to use the full set of monomers, i.e., methyl acrylate, ethyl acrylate, butyl acrylate, and

acrylonitrile. Moreover, given the 30 wt % value, on average it appears that the amount of each of the above monomers is 7.5 wt % which would overlap the ranges given in claim 1's multipolymer. Although this amount of 7.5 wt % exceeds that for the claimed ethyl acrylate monomer concentration, this is easily compensated for by having slightly higher concentrations of the other three monomers. In light of the advantageous properties of high impact-resistance and transparency imparted to the composition with the use of Toyo's multipolymer and the utility of various common additives taught by Toyo and Cutter, it would therefore have been obvious to one of ordinary skill in the art to modify Troy et al's composition and thereby arrive at the present invention.

With respect to claim 5, it is written in product-by-process format where the composition of either claims 1 or 2 is modified by a process that does not necessarily add additional limitations to the composition. The use of polymeric additives is considered to be a process limitation to which no patentable weight is to be given, absent a showing of an unobvious difference between the claimed and referenced products, i.e., the auxiliary additives are within the scope of the composition of claims 1 and 2. Case law holds that "even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production." See *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) and MPEP § 2113.

Should the addition of polymer additives be considered as a limitation, the rejection below applies.

7. Claims 5, 6, and 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Troy et al in view of Toyo and further in view of Cutter et al as applied to claims 1, 2, 5, 13, and 14 above, and further in view of Siol (US 4,985,504).

With respect to claim 5, although Troy et al is silent in regards to the addition of auxiliary polymer additives that can tune the refractive index of the multipolymer hard phase to match the butadiene rubbery phase, it is open to mixtures of matrix polymers (col. 3, line 17) in addition to refractive index matching methods as indicated in col. 4, lines 55-59. Siol discloses a method of refractive index matching where the addition of a second polymer to a first polymer is done to modify the refractive index of the first polymer, i.e., to tune the refractive index of the overall blend, so that the refractive index matches that of the rubber component of the blend. Given that Troy et al is open to refractive index matching and in view of the teachings by Siol to modify refractive index with a secondary polymer, it would have been obvious to one of ordinary skill in the art to modify the refractive index of the product of the present invention as claimed in claims 1 or 2 by adding auxiliary polymers.

With respect to claim 6, Siol blends polystyrene with an acrylic-based polymer to reduce refractive index of the polystyrene so that the overall blend's refractive index matches the refractive index of an additional rubber phase (col. 8, lines 52-58), and in one potential embodiment, the second polymer is a copolymer of methyl methacrylate (col. 12, lines 37-44).

Siol does not disclose the specific presently claimed formulations. Toyo teaches that to increase transparency of an acrylic-based/butadiene rubber composition, the proportion of monomers in the multipolymer composition should be controlled so that the difference in refractive index between the multipolymer and the butadiene rubber is not greater than 0.005

units (page 6, lines 101-109). Although Toyo does not disclose adding polymer additives, one of ordinary skill in the art would recognize that refractive index modification of the matrix through either monomer composition or addition of a miscible polymer to the matrix to form a blend results in the same matrix product of a particular refractive index, i.e., a matrix with the same composition of monomers, and would be motivated to add on-hand auxiliary polymers rather than proceed with a time-consuming process of polymerizing other multipolymers to fine tune the refractive index.

Such potential compositions of auxiliary polymers are disclosed by Siol and Toyo (Formula A) and by Toyo (Formula B). Toyo describes copolymers comprising 40 to 85 wt % methyl methacrylate, 15 to 60 wt % styrene, and preferably at most 20 wt % of at least one comonomer selected from methyl acrylate, ethyl acrylate, butyl acrylate and acrylonitrile (page 2, line 115). With respect to Formula A, Siol discloses a copolymer of methyl methacrylate whose monomer concentration is from 20 to 100 wt % and is open to additional low refractive index comonomers such as methyl acrylate (col. 12, lines 37-44). With respect to Formula B, as the multipolymer composition disclosed in claim 1, one of ordinary skill in the art would be able to arrive at Formula B's composition due to their overlapping composition ranges: the leftover 20% can be split be unevenly split between acrylonitrile and ethyl acrylate whereby acrylonitrile is in excess. Given the discussed advantages of polymer additives and the polymer additive compositions disclosed by the prior art, it would have been obvious to one of ordinary skill in the art to utilize auxiliary polymer additives to fine tune the refractive index of a matrix polymer to match that of the rubber particles.

With respect to claims 7-10, Troy et al does not explicitly disclose the use of additives however its composition is open to common additives as indicated by an example that includes lubricants, plasticizers, and processing aids (col. 5, lines 25-42). Toyo discloses the use of plasticizers in a composition comprising an acrylic-based multipolymer modified with a butadiene rubber (page, 8, lines 70-77) and Cutter discloses the use of UV stabilizers such as benzotriazoles such as 2-(2-hydroxy 5 methyl phenyl) benzotriazole in amounts up to 1 wt % and antioxidants in amounts up to 1 wt % as advantageous to improve thermal stability and weatherability in an acrylic-based, butadiene rubber-modified composition (col. 4, lines 8-22). Therefore, given that Troy et al is open to the addition of additives and in view of the teachings by Toyo and Cutter, it would have been obvious to one having ordinary skill in the art to utilize the aforementioned additives and thereby arrive at the present invention. Moreover, the addition of lubricants, processing aids, plasticizers, and UV stabilizers are optional as suggested by a percent concentration that includes 0 wt %.

With respect to claim 11, although Troy et al is silent in regards to the impact strength of its composition, it is inherent that a composition comprising an acrylic-based copolymer and a compatible modified-butadiene rubber retain impact strength at a “commercially significant level” at some temperatures below 0°F because butadiene rubber has a sub-zero glass transition temperature and would exhibit some ductile properties below 0°F. It would therefore have been obvious to one of ordinary skill in the art to envision a butadiene composition with such sub-zero temperature impact properties.

8. Claims 12, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Troy et al (US 5,599,854) in view of di Leone et al (US 4,085,166).

Troy et al discloses a composition comprising from 2 to 40% of a methyl methacrylate-butadiene-styrene (MBS) copolymer (col. 3, lines 12-14) polymerized from a free-radical process (col. 12, line 15) and from 60 to 98% of a matrix polymer that includes, for example, poly(methyl methacrylate), styrene-acrylonitrile copolymers, and the like (col. 1, lines 10-11; col 2, line 8). The average rubber particle size ranges from 120 to 240 nm. The composition is open to common additives as indicated by an example that includes lubricants, plasticizers, and processing aids (col 5, lines 25-42). DiLeone et al discloses the use of plasticizers and antioxidants in a composition comprising an acrylic based terpolymer modified with a butadiene rubber (col. 2, lines 31-35). Moreover, the addition of an antioxidant is optional as suggested by a percent concentration that includes 0 wt %.

Troy et al does not disclose the specific terpolymer as given in claim 12. DiLeone teaches the use of a terpolymer of methyl methacrylate, styrene, and ethyl acrylate in a composition to obtain improved properties of toughness, rigidity and transparency (col. 2, lines 51-52). Therefore, it would have been obvious to one of ordinary skill in the art to utilize the terpolymer as taught by DiLeone for the advantage of improved toughness and transparency and such common additives such as a plasticizer and an antioxidant in Troy et al's composition and thereby arrive at the present invention.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. JP 04-294148-A discloses an acrylic multipolymer. A full translation has been requested.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vickey Ronesi whose telephone number is (571) 272-2701. The examiner can normally be reached on Monday - Friday, 8:30 a.m. - 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Vickey Ronesi
06/09/2004

Vasu Jagannathan
VASU JAGANNATHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700